Atty Dkt. No. ROC920000302US1
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Inventor: Haugen et al
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Sheet 1 of 4

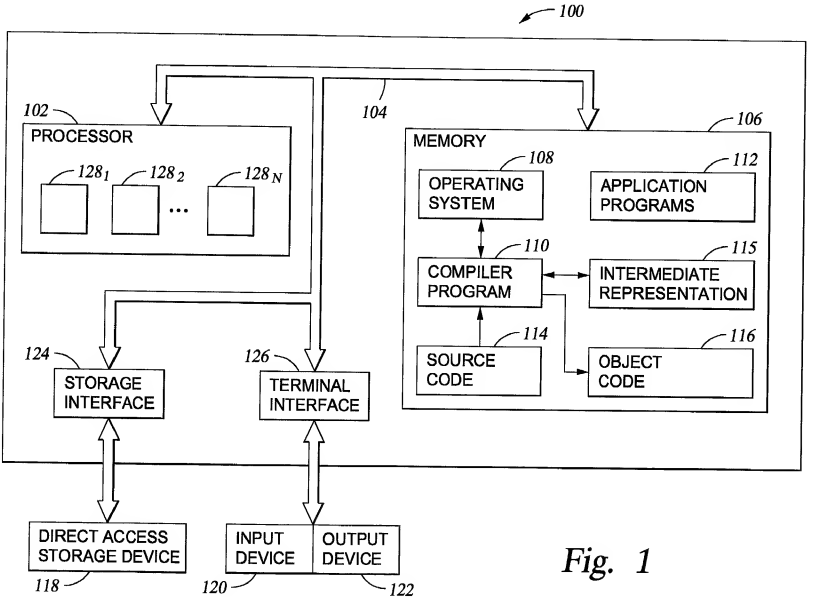


Fig. 1

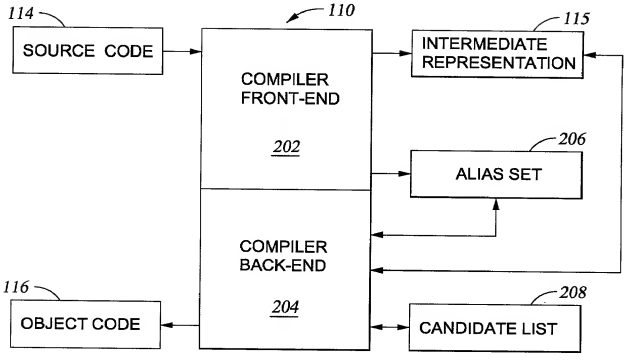

114
SOURCE CODE
110
COMPILER
FRONT-END
202
115
INTERMEDIATE
REPRESENTATION
206
ALIAS SET
COMPILER
BACK-END
204
116
OBJECT CODE
208
CANDIDATE LIST

Fig. 2

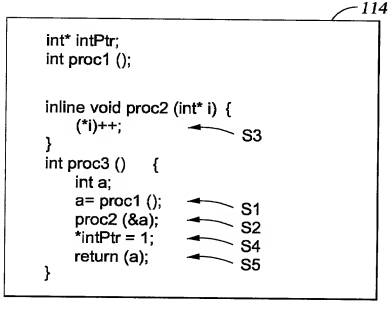

114
int* intPtr;
int proc1 ();
inline void proc2 (int* i) {
(*i)++;
S3
}
int proc3 () {
int a;
a= proc1 ();
S1
proc2 (&a);
S2
*intPtr = 1;
S4
return (a);
S5
}

Fig. 3

115

```
@S1 a = proc1 ();
CALL proc1  //Call procedure 'proc1'
STR  a      //Store return value into 'a'
@S2 proc2(a);
LDA  a      //Load address of 'a'
STR  i      //Store address of 'a' into inline parameter 'i'
@S3 (*i)++;
LOD  i      //Load 'i'
IND  int*   //Load integer value pointed to by 'i' (indirect load of 'a')
INC  1      //Increment value
LOD  i      //Load 'i'
STO  int*   //Store increment integer value at location pointer to by 'i'
              (indirect store to 'a')
@S4 *intPtr = 1;
LOD  1      //Load value 1
LOD  intPtr //Load 'intPtr'
STO  int*   //Store 1 at location pointed to by 'intPtr'
@S5 return (a);
LOD  a      //Load 'a'
RET         //Return
```

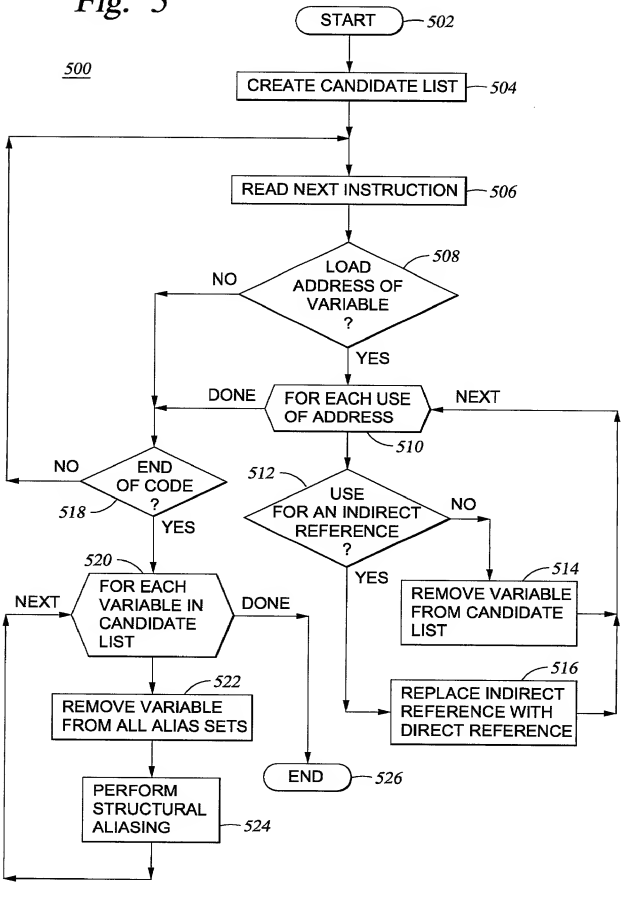
Fig. 4

115

```
@S1 a = proc1 ();
CALL proc1  //Call procedure 'proc1'
STR  a      //Store return value into 'a'
@S3 (*i)++;
LOD  a      //Load 'a'
INC  1      //Increment value
STR  a      //Store incremented value into 'a'
@S4 *intPtr = 1;
LOD  1      //Load value 1
LOD  intPtr //Load 'intPtr'
STO  int*   //Store 1 at location pointed to by 'intPtr'
@S5 return (a);
LOD  a      //Load 'a'
RET         //Return
```

Fig. 6

Fig. 5


500
START
502
CREATE CANDIDATE LIST
504
READ NEXT INSTRUCTION
506
LOAD ADDRESS OF VARIABLE ?
508
NO
YES
DONE
FOR EACH USE OF ADDRESS
NEXT
510
NO
END OF CODE ?
518
YES
512
USE FOR AN INDIRECT REFERENCE ?
NO
YES
514
REMOVE VARIABLE FROM CANDIDATE LIST
516
REPLACE INDIRECT REFERENCE WITH DIRECT REFERENCE
520
NEXT
FOR EACH VARIABLE IN CANDIDATE LIST
DONE
522
REMOVE VARIABLE FROM ALL ALIAS SETS
PERFORM STRUCTURAL ALIASING
524
END
526